CLAIMS

What is claimed is:

1. A method for speculatively reusing regions of code, the method comprising:

identifying a reuse region and a data input to the reuse region;

determining whether a data output of the reuse region is contained within reuse region instance information pertaining to a plurality of instances of the reuse region; and

when the data output is not contained within the reuse region instance information, predicting the data output of the reuse region based on the reuse region instance information.

2. The method of claim 1 wherein determining whether the reuse region instance information contains a data output comprises:

determining whether the data input to the reuse region matches any input information within the reuse region instance information; and

when the data input matches input information within the plurality of instances, determining whether the reuse region is identified by a normal reuse instruction..

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3. The method of claim 1 wherein the reuse region instance information includes input information and output information for each instance of the reuse region.

4. The method of claim 3 wherein the reuse region instance information further includes a plurality of confidence counters for each live-out register of the reuse region, each of the plurality of confidence counters being associated with a certain prediction technique.

5. The method of claim 1 wherein predicting the data output further comprises: predicting a current set of live-out registers of the reuse region; and

predicting an output value for each live-out register within the current set of live-out registers using at least one prediction technique and a prediction list maintained in the buffer.

6. The method of claim 5 wherein predicting an output value for each live-out register further comprises selecting the at least one prediction technique from multiple prediction techniques based upon a plurality of confidence counters associated with the live-out register, each of the plurality of confidence counters corresponding to a certain prediction technique.

7. The method of claim 6 wherein multiple prediction techniques comprise a context-based prediction technique, a stride prediction technique, and a last value prediction technique.

8. An apparatus comprising:

a buffer to hold reuse region instance information pertaining to a plurality of instances of a reuse region; and

a processing core to predict a data output of the reuse region based on the reuse region instance information, and to speculatively execute instructions using the predicted data output of the reuse region.

9. The apparatus of claim 8 wherein the processing core is configured to determine whether a data output of the reuse region is to be predicted.

10. The apparatus of claim 9 wherein the processing core is further configured to search the buffer for a matching instance and to determine whether the reuse region is identified by a normal reuse instruction

11. The apparatus of claim 8 wherein the reuse region instance information includes input information and output information for each instance of the reuse region.

12. The apparatus of claim 11 wherein the reuse region instance information further includes a plurality of confidence counters for each live-out register of the reuse region, each of the plurality of confidence counters being associated with a certain prediction technique.

13. The apparatus of claim 8 wherein the buffer includes a prediction list having a plurality of pointers to reuse region instances held in the buffer, a pointer to the most currently used instance being located on the top of the prediction list and a pointer to the least currently used instance being located at the bottom of the prediction list.

14. The apparatus of claim 8 wherein the buffer includes a value prediction table having an entry that includes a predicted output value, the predicted output value being located using an index.

15. The apparatus of claim 8 wherein the processing core is further configured to predict a current set of live-out registers of the reuse region, and to predict an output value for each live-out register within the current set of live-out registers using at least one prediction technique and a prediction list maintained in the buffer.

16. The apparatus of claim 15 wherein the at least one prediction technique is selected from multiple prediction techniques based upon a plurality of confidence counters associated with the live-out register, each of the plurality of confidence counters corresponding to a certain prediction technique.

17. The apparatus of claim 16 wherein multiple prediction techniques comprise a context-based prediction technique, a stride prediction technique, and a last value prediction technique and wherein the prediction list points to

the most recently used instance when the last value prediction technique is used,

two most recently used instances when the stride prediction technique is used, and

instances associated with a corresponding live-out register when the context-based prediction technique is used, the associated instances being used to calculate an index pointing to a predicted output value in a value prediction table maintained in the buffer.

18. A system comprising:

a memory to store regions of code; and

a processor, coupled to the memory, to identify a reuse region in the regions of code, to determine whether a data output of the reuse region is contained within reuse region instance information pertaining to a plurality of

instances of the reuse region, and when the data output is not contained within the reuse region instance information, to predict the data output of the reuse region based on the reuse region instance information.

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19. The system of claim 18 wherein the processor comprises a buffer to store the reuse region instance information.

20. The system of claim 19 wherein the reuse region instance information includes input information and output information for each instance of the reuse region.

21. The system of claim 19 wherein the reuse region instance information includes a plurality of confidence counters for each live-out register of the reuse region, each of the plurality of confidence counters being associated with a certain prediction technique.

22. The system of claim 19 wherein the buffer includes a prediction list having a plurality of pointers to reuse region instances held in the buffer.

23. The system of claim 19 wherein the buffer includes a value prediction table having an entry that includes a predicted output value, the predicted output value being located using an index.

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24. A computer readable medium comprising instructions, which when executed on a processor, perform a method for speculatively reusing regions of code, the method comprising:

identifying a reuse region and a data input to the reuse region;

determining whether a data output of the reuse region is contained within reuse region instance information pertaining to a plurality of instances of the reuse region; and

when the data output is not contained within the reuse region instance information, predicting the data output of the reuse region based on the reuse region instance information.

25. The computer readable medium of claim 24 wherein determining whether the reuse region instance information contains a data output comprises:

determining whether the data input to the reuse region matches any input information within the reuse region instance information; and

when the data input matches input information within the plurality of instances, determining whether the reuse region is identified by a normal reuse instruction.

26. The computer readable medium of claim 24 wherein the reuse region instance information includes input information and output information for each instance of the reuse region.

27. The computer readable medium of claim 26 wherein the reuse region instance information further includes a plurality of confidence counters for each live-out register of the reuse region, each of the plurality of confidence counters being associated with a certain prediction technique.

28. The computer readable medium of claim 24 wherein predicting the data output further comprises:

predicting a current set of live-out registers of the reuse region; and

predicting an output value for each live-out register within the current set of live-out registers using at least one prediction technique and a prediction list maintained in the buffer.

29. The computer readable medium of claim 28 wherein predicting an output value for each live-out register further comprises selecting the at least one prediction technique from multiple prediction techniques based upon a plurality of confidence counters associated with the live-out register, each of the plurality of confidence counters corresponding to a certain prediction technique.

30. The computer readable medium of claim 29 wherein multiple prediction techniques comprise a context-based prediction technique, a stride prediction technique, and a last value prediction technique.